

acknowledged the "incontrovertible evidence"¹ that New York Telephone contemplated installing a broadband system and that fiber and associated equipment were needed for that system. We went on, however, to distinguish between that statement and the conclusion that New York Telephone was installing fiber solely or even primarily for the purpose of advancing its broadband plans. We also were unpersuaded by the Hatfield proponents' reference to a Bellcore Carrier Serving Area (CSA) standard suggesting that links shorter than 12,000 feet might be provisioned over copper without any disruption to narrowband voice and digital services; we credited New York Telephone's explanation of why that standard was not pertinent here and added that it pertained to long distribution lines, not feeder lines.

We went on to cite a 1991 analysis (the Network Study) presented by New York Telephone to the Communications Division in the Network Modernization Proceeding and showing benefits to the use of fiber technology for the remaining 25% of feeder relief jobs that were still using copper; those findings, we said, were reported in the ensuing staff report (the Staff Network Report or the Report) and reflected in the ultimate decision.² The Network Study and Staff Network Report found that investment costs associated with fiber exceeded those of copper but that the difference was more than offset by fiber's lower provisioning and maintenance costs and by fiber's ability to permit the construction of a self-healing Synchronous Optical Network (SONET), in which outages became much less likely. We saw no clear explanation for the Hatfield Model's contrary result, which showed higher costs for fiber, and we concluded as follows:

¹ Opinion No. 97-2, mimeo p. 82.

² Case 91-C-0485, New York Telephone Company - Network Modernization, Staff Report Assessing Network Modernization Needs and New York Telephone's Plans (November 4, 1992) (the Staff Report), p. VII-10; Opinion No. 94-7 (Issued March 14, 1994). The Network Study, a confidential document provided to staff under trade secret protection, is formally titled "The Network of Tomorrow: Guidelines for Fiber Deployment in the Loop."

In view of the prior staff analysis, which has not been compellingly refuted, we cannot conclude that New York Telephone, by reflecting in its study its actual forward-looking practice of installing 100% fiber feeder, has inflated the costs of its narrowband network or required purchasers of network elements to subsidize its broadband ventures. In addition, it should be borne in mind that competitors, in the future, may want to use purchased elements to provide enhanced services to their own customers, and that fiber may prove useful for those purposes.¹

Before the parties' arguments are presented, some terminology, used primarily in New York Telephone's response, should be described. New York Telephone's study was premised on the use of Integrated Digital Loop Carrier (IDLC), which refers to one of two ways in which a Digital Loop Carrier (DLC) facility can be connected to central office equipment; the other is Universal DLC (UDLC). DLC itself is a loop technology that reduces the amount of feeder in the network by enabling large amounts of traffic to be multiplexed digitally onto a single facility; without it, multiple transmission facilities would be required. IDLC enables DLC traffic to be exchanged with a switch directly in digital format, without conversion to analog; it cannot be used in the few remaining analog central offices. UDLC exchanges traffic in analog format, requiring that the traffic be demultiplexed. In general, IDLC is considered to be more cost-effective than UDLC, for it requires less electronic equipment at the central office.

A DLC transmission facility, whether IDLC or UDLC, may in principle use either copper or fiber. On a going-forward basis, New York Telephone's practice is to use only fiber for IDLC; as of December 1996, 76% of its feeder was provided over fiber and 24% over copper. New York Telephone asserts that its study's premise of "the ubiquitous deployment of IDLC technology

¹ Opinion No. 97-2, mimeo pp. 83-84.

. . . means that all of the feeder plant [except for a certain short connection] utilizes optical fiber rather than copper."¹

Asserted Grounds For Rehearing

Characterizing this decision as our "largest error,"² AT&T contends that it accounts for nearly all of the difference between the loop rates we approved and the assertedly much lower loop rates that prevail around the nation. Maintaining that the cost difference between using fiber for all loops and using it only for loops exceeding 9,000 feet comes to approximately \$3.00 per loop,³ AT&T calculates a cost increase to New York consumers of nearly \$400 million annually as a result of this decision. AT&T cites what it regards as a nearly universal consensus that copper is cheaper for shorter loops, and it sees no basis for distinguishing New York in this regard. It therefore asserts that the loop rates we approved violate various sections of the 1996 Act inasmuch as they are neither cost-based nor nondiscriminatory and permit New York Telephone to subsidize its broadband plans by imposing their costs on captive carriers and customers interested only in narrowband telephony.

More specifically, AT&T contends, first, that even though New York Telephone bears the burden of proof, it offered no record evidence in support of its 100% fiber network design. Asserting that as loop length decreases, the per-foot cost of fiber feeder inevitably increases (because of the significant fixed costs of the sophisticated electronics required at each end), AT&T maintains that its own study, which showed the resulting advantages of copper at shorter loop lengths, was the only quantitative analysis of the issue on the record. It argues that New York Telephone presented no quantitative evidence in

¹ New York Telephone's Response, p. 9.

² AT&T's Petition, p. 8.

³ We discuss below the adjustment to that estimate implied by the other adjustments we have made to the Hatfield inputs.

support of its view and that its qualitative opinion testimony about the advantages of fiber in no way refuted AT&T's showing.

AT&T goes on to challenge what it characterizes as our improper reliance on an extra-record cost study, adding that our having done so provides the best evidence that New York Telephone failed to carry its burden of proof. As a matter of procedure, AT&T objects that parties were not put on notice that we might rely on a 1991 New York Telephone cost analysis and thus were denied the opportunity to challenge it on the record. Compounding this denial of due process, AT&T says, was a reversal of the burden of proof, inasmuch as we cited the Hatfield proponents' failure to compellingly refute a study that they had not been informed would be relevant.

AT&T raises substantive objections as well. It contends that the Staff Network Report was filed in a proceeding whose objective was to define a network of the future, not to determine costs; that no formal evidentiary review of the 1991 Network Study had been undertaken; that the Network Study examined a network designed for both voice-grade service and broadband and thus was irrelevant to the issues raised here; that the Staff Network Report in fact criticized New York Telephone's cost estimates and declined to find that fiber was the least-cost feeder technology; and that a 1991 cost study cannot prove cost-effectiveness in 1997. Asserting that "staff appears simply to have abandoned its role as cost analyst, its job here, to resume the role of cheerleader for fiber technology, its role in 1991,"¹ AT&T says that one need not abandon affection for fiber technology in order to correctly analyze the cost efficiency of a network for voice grade services.

Because fiber is not the least-cost technology for narrowband feeder, AT&T continues, the use of an all-fiber premise violates various provisions of the 1996 Act. These include, according to AT&T, the 1996 Act's requirements that rates be cost-based (§§251(c)(3) and 252(d)(1)) and

¹ AT&T's Petition, p. 23.

nondiscriminatory (§§252(c)(3) and 252(d)(1)). With respect to the latter, AT&T alleges that the discrimination exists as a result of New York Telephone charging its potential competitors above-cost rates, thereby providing those competitors less favorable terms than it provides to itself. In addition, it claims the loop rates violate §254(k) of the Act, which provides that "a telecommunications carrier may not use services that are not competitive to subsidize services that are subject to competition." AT&T sees here "a textbook example"¹ of such cross subsidization, for the provision of network elements is not competitive, inasmuch as New York Telephone exercises monopoly control over them; the emerging broadband markets are competitive; narrowband services do not require fiber feeder at all feeder lengths; New York Telephone plans to install a broadband system for which fiber is needed; and the Commission has assigned all of the costs of fiber feeder to narrowband services. AT&T cites, in this regard, an admonition by Alfred Kahn, "whose writings [New York Telephone] claims form the intellectual basis for its position,"² that inasmuch as costs in excess of the narrowband stand-alone costs are attributable to broadband services, those costs must be recovered in revenues from unregulated broadband services.

More broadly, AT&T contends that the decision violates not only the plain language of the 1996 Act but its procompetitive structure and purposes. It explains how cross-subsidies can foreclose efficient competition and contends that diversified telephone companies have a natural incentive to shift costs to their monopoly services. While New York Telephone is free to build an all-fiber network, AT&T argues, it cannot require basic telephone carriers and customers to fund that initiative, as Opinion No. 97-2, in AT&T's view, permits it to do.

¹ Ibid., p. 27.

² Id.

Finally, AT&T argues that even if all-fiber feeder could be justified on a cost basis for narrowband applications, assigning all of its costs to captive narrowband customers would violate the Commission's own policy "that narrowband customers should receive some of the benefit of the economy of scope between telephony and broadband services."¹ It might be reasonable, AT&T continues, to assign all of these costs to regulated services if New York Telephone's earnings were regulated and earnings from unregulated services could ultimately be applied to the benefit of purchasers of regulated services; but since that is not the case, a sharing of costs is needed. AT&T cites various staff and Commission statements to this effect and contends that the result reached in Opinion No. 97-2 is at odds with these policies. It concludes that "the Commission must either base loop rates on the least cost copper/fiber feeder mix supported by the record or on an appropriate allocation of an all fiber feeder network (that does not exceed the stand alone cost of a least cost copper/fiber mix)."²

MCI argues similarly, though with different emphases. It challenges, on due process grounds, the reliance on the Staff Network Report, stressing that parties had no reason to anticipate its use and were unable to refute it. It notes as well the exclusion of the report from the record of an earlier proceeding in which MCI itself had proffered it, and it cites trial staff's objection to its introduction there on the grounds that no sponsor could testify to its contents and that staff had never been notified that the report would be relied upon by one of the parties.³ MCI adds that the report was never subjected to cross-examination in the Network Modernization Proceeding for

¹ Ibid., p. 31.

² Ibid., p. 34.

³ Case 92-C-0665, New York Telephone Company - Incentive Regulation - Track II, Tr. 7,793. MCI appends to its petition the complete on the record exchange among the parties and the Administrative Law Judges regarding introduction of the report.

which it was prepared and that its findings are based on information provided only by New York Telephone. Moreover, MCI continues, New York Telephone, as the proponent of basing costs on an all-fiber network, bore the burden of demonstrating the cost-effectiveness of that technology but never submitted testimony supporting its position.

After reviewing decisions in other jurisdictions in support of using copper for short loops, MCI contends it is implausible that engineering differences between New York and those jurisdictions warrant different results in this regard. It also suggests, as it did in the case-in-chief, that the evidence supports the premise that New York Telephone's use of all-fiber is intended to support its broadband network and adds that New York Telephone simply did not study a telephony-only network.

Finally, MCI maintains that the Staff Network Report itself is unpersuasive. It cites staff's reasons for objecting to introduction of the Report in Case 92-C-0665; these included contentions that the Report was preliminary, confusing, inconsistent with what the Commission had ruled in other proceedings, and too voluminous to introduce at the hearings without previous notice. It asserts that the Report was not a detailed or quantitative study but rather a broad-brush survey that sought to provide only a statement of principles relating to New York Telephone's modernization. According to MCI, "the Report did not even purport to consider the costs of provisioning a network designed to provide two-wire analog voice-grade service. To the contrary, it gathered qualitative information about the panoply of services offered by [New York Telephone] and it made recommendations regarding an entire mix of low-cost technologies that [New York Telephone] should develop in the future."¹ It cites as well the report's statement that "copper is still being used when the economics specifically warrant it

¹ MCI's Petition, p. 16.

(such as for jobs involving short distances)."¹ MCI concludes by characterizing the adoption of universal fiber feeder as particularly egregious because of its substantial difference in price; as already noted, AT&T calculated that difference at approximately \$3 per month per loop.

MFS similarly criticizes the decision for relying on an extra-record document rather than the evidence in the proceeding. Stressing that parties had no opportunity to address themselves to the Staff Network Report, it notes that New York Telephone referred to it in its reply brief but not in its initial brief and suggests that staff, had it wanted to rely on the Report, could have asked parties to consider it together with other matters raised in the list of questions addressed by staff to the parties. MFS points to the different nature of the Network Modernization Proceeding, which did not consider costing, and to the age of the report and its reliance on technology assumptions different from those in the case.

Sprint, also objecting to costing on the basis of all-fiber feeder, suggests that doing so sends wrong signals that encourage inefficient overbuilding of facilities in dense areas and discourage efficient facilities deployment in rural areas.²

NYCHA's response echoes these views, asserting that fiber is the least-cost technology for short loops only where broadband is to be provided for.

New York Telephone's Response

New York Telephone responds to the foregoing arguments, asserting, in general, "that the Commission did not adopt the IDLC construct despite its high costs, it adopted that construct because it concluded that fiber-based IDLC is in fact the most

¹ Staff Network Report, p. VII-10, quoted at MCI's petition (emphasis added by MCI), p. 17.

² Sprint's Petition, pp. 3-4.

cost-effective technology available."¹ In support of that conclusion, it cites the record, defends the propriety of our partial reliance on the Staff Network Report, and disputes AT&T's arguments concerning the legality of the decision.

With regard to the record, New York Telephone points to the testimony of its witness Gansert that fiber feeder technology is more efficient than copper because of its smaller size and weight, the ease with which it can be rearranged (electronically rather than mechanically), its reduced maintenance costs, and the higher transmission quality it provides. It asserts we have acknowledged these factors not only in the Staff Network Report but also in the Incremental Loop Cost Study Manual. It cites as well a quantitative analysis of the cost savings achievable with DLC/fiber feeder technology set forth in the Network Study, which was provided in this proceeding as part of New York Telephone's response to an interrogatory.² It adds that its post-hearing analysis of costs in the major cities area, using its own cost model but assuming 100% deployment of copper cable, showed a cost increase of 65¢ per loop over the figure produced on the premise of 100% fiber.³

New York Telephone goes on to dispute the sensitivity analysis submitted by AT&T to show the \$3.00 cost penalty allegedly associated with an all-fiber construct rather than a 9,000 foot cross-over point. It contends the analysis is based on a series of Hatfield runs that suffer from various flaws including incorrect modeling of the number of conduits for multiple copper cables in a single feeder route; underestimating the cost of structure;⁴ failing to reflect the larger trench

¹ New York Telephone's Response, p. 11, emphasis in original.

² New York Telephone's response to interrogatory ATT-NYT 245. The response was marked as Exhibit 135, though a copy of the report was not attached.

³ AT&T vigorously challenged this result in its brief.

⁴ Structure refers to the equipment housing or supporting the feeder lines.

size required with copper feeder; and failing to count the number of DLC lines correctly when all-fiber feeder is assumed. Noting, as it did in its reply brief, that assuming copper feeder below a cross-over point of 9,000 feet essentially replicates its existing plant in Manhattan, New York Telephone regards as preposterous the resulting Hatfield estimate of plant investment for Manhattan that is less than 20% of the actual figure. It alleges other flaws in AT&T's analysis and asserts that AT&T failed to recognize that by concentrating loop costs in the terminating electronics, DLC technology significantly reduces the costs of the frequent rearrangements required in a competitive environment.

Contending that inadequate citations prevented it from reviewing each of the out-of-state references offered by AT&T, New York Telephone suggests, as a general matter, that those practices, and their 9,000-12,000 foot cross-over points, may reflect embedded copper-driven investment and therefore be inapplicable to a fully forward-looking study unconstrained by embedded copper technology. It reiterates its many bases, set forth in its reply brief, for distinguishing the Southern New England Telephone Company study previously relied on by AT&T and notes that AT&T appears to have abandoned that reliance; New York Telephone suggests that example illustrates "the dangers of uncritically relying on studies from other states without understanding what facts and assumptions underlie [them]."¹ It suggests as well, again as it did in its reply brief, that some of the practices cited appear to be engineering-based ceilings on copper feeder length rather than economics-based floors. It questions AT&T's reliance on the more recent out-of-state studies reported in its petition, contending that they do not explicitly address the cross-over point issue, and asserts "that the Potemkin village of case citations that AT&T has erected cannot be taken at face value, and that in general statements about what other telephone companies are doing cannot be accepted in this

¹ New York Telephone's Response, p. 17.

proceeding without the benefit of evidence submitted to this Commission that explains the basis of those practices."¹

New York Telephone next defends, both substantively and procedurally, our reliance on the Staff Network Report. It contends that Report's criticisms of New York Telephone's analyses, cited by AT&T, related to New York Telephone's plans for accelerated fiber deployment and pertained to their pace, not to the ultimate desirability of installing fiber. Turning to procedural matters, New York Telephone disputes the suggestion that we relied exclusively on the Network Study and Staff Network Report and cites the evidence here on these matters and the references to it in Opinion No. 97-2. It adds that New York Telephone's Network Study was, in fact, referred to on the record² and that while it was not itself introduced into the record, AT&T cross-examined New York Telephone witness Gansert about it. New York Telephone regards as "absurd on its face"³ AT&T's claim that it was never put on notice that the Commission might rely on the 1991 cost analysis.

New York Telephone offers similar arguments with regard to the Staff Network Report and asserts that the petitions fail to recognize that the Commission, "as an expert agency, may properly rely on analyses prepared by its Staff, even if these analyses are not entered as evidence in a proceeding, and may also reasonably apply policy decisions made in one case to subsequent cases."⁴ Pointing to the full opportunity given to parties in the Network Modernization Proceeding (including MCI and AT&T) to present their views, New York Telephone states that the Commission fully considered those views in deciding that there was no need "to intervene in New York Telephone's

¹ Ibid., p. 18 (emphasis in original).

² New York Telephone's response to ATT-NYT 245, included in Exhibit 135, referred to above.

³ New York Telephone's Response, p. 24.

⁴ Ibid., p. 25.

investment program or require [it] to pursue a different course of action."¹ It distinguishes the exclusion of the Staff Network Report from the record in Track 2 of the Incentive Regulation Proceeding (noting that while the Judges there did not allow the entire document to be introduced in evidence, they were willing to allow its more limited use); and it cites numerous cases sustaining the Commission's authority to rely on staff analyses not part of the evidentiary record or to reach conclusions not urged by any party to a proceeding.

New York Telephone also disputes AT&T's claim that the decision violates the 1996 Act, contending that the resulting rates are, in fact, cost-based; that they are not discriminatory, inasmuch as New York Telephone derives no benefit from using a more expensive copper-based plant; and that the differences between TELRIC loop costs and embedded loop costs are an inevitable consequence of the TELRIC method. It also denies the existence of a cross-subsidy, inasmuch as the network studied by New York Telephone is not a broadband-capable network; it explains that while the network includes fiber feeder that could be used for broadband, such use could not be made without the installation of additional facilities at either end of the fiber. It asserts that the investments it studied for this case "provide no basis for offering broadband services other than some potential use of 'spare fiber.' In fact, the spare fiber is placed because it costs little on a marginal basis and provides cheap insurance against unanticipated growth in demand or damage and deterioration of the working fiber."² Accordingly, New York Telephone argues, there is no basis for concluding that competitors are being forced to pay for New York Telephone's future broadband services.

Finally, New York Telephone contends that even if IDLC could by itself support broadband services--something, again, it

¹ Ibid., p. 27, citing Case 91-C-0485, supra, Opinion No. 94-7, mimeo p. 41.

² New York Telephone's Response, p. 35.

cannot do--the subsidy argument would still be incorrect. The TELRIC approach, it reasons, aims to determine the costs of particular network elements, such as local loops, without inquiring into how element costs should be allocated to particular services. It regards this as among the advantages of the TELRIC method cited by the FCC and, inasmuch as the inquiry is not into the cost of various services, "the question of whether loops are used for broadband as well as voice-grade transmission is thus irrelevant to the element costing issue."¹ In a similar vein, New York Telephone cites a March 8, 1995 staff memorandum to the Commission concerning the Loop Cost Study Manual, in which staff disputes the State Consumer Protection Board's contention that the cost of a basic loop should be the cost of a loop configured to provide only voice-grade service but not enhanced features such as video or high speed data transmission.

Discussion

The parties have directed considerable attention to the Network Study and the Staff Network Report, a consequence of the perhaps undue prominence we gave these documents in Opinion No. 97-2. But, as the opinion itself may not have made plain enough, our decision rested primarily on our evaluation of the record evidence and staff's expert advice in light of that evidence.

The evidence included New York Telephone's explanation of the advantages of fiber over copper for even short loop lengths, an explanation that emphasized the lower structure costs associated with fiber and the ease and economy with which fiber facilities could be rearranged to accommodate changing customer demands, thereby diminishing the risk of under-utilized investment.² And while New York Telephone's testimony did not

¹ Ibid., p. 36.

² Tr. 3,183-3,184.

itself set forth specific quantitative information on the relative economics of the two transmission media, that information was included in the Network Study (described by its witness as "a cost study that demonstrated our optical loop design"¹) and, as noted, was made available to the parties. Meanwhile, we saw numerous weaknesses, described in Opinion No. 97-2, in the Hatfield proponents' treatment of the issue and found their 9,000-foot cross-over point less credible than the all-fiber construct offered by New York Telephone in this proceeding and confirmed by the result of the Network Modernization Proceeding. Far from relying solely on the Network Study and the Staff Network Report, we simply made use of those documents, properly, as we exercised our expertise in evaluating the record in this case.

The arguments offered on rehearing do nothing to undermine these conclusions and, to a great extent, reiterate those already considered. But because of the importance of the issue² and the vigor of the arguments on rehearing, we are taking this opportunity to elaborate on the rationale for the fiber decision, as follows.

While New York Telephone's embedded telephone plant incorporates substantial amounts of copper feeder, virtually none

¹ Tr. 3,267.

² While the issue is clearly an important one, its dollar impact, even on the basis of the Hatfield analysis itself, does not appear to be quite so great as AT&T and MCI suggest. Accepting, for the sake of demonstration only, the Hatfield Model's method and making only our other adjustments to the Hatfield calculations (set forth at Opinion No. 97-2, Attachment C, Schedule 2, p. 1 of 3), the effect of changing the crossover point from 9,000 feet to zero turns out to be \$1.60 per loop, not the \$3.00 per loop calculated by AT&T. AT&T's calculation of a \$400 million total cost to consumers (which also may be overstated on account of other questionable assumptions regarding market penetration by purchasers of network elements and the extent to which savings would be flowed through to end-users) would be correspondingly reduced. (These results, again, are per Hatfield; as explained in the text, we are persuaded that a proper analysis would show the all-fiber-feeder construct to be cheaper.)

is being installed on a going-forward basis, and fiber is clearly the forward-looking medium of choice.¹ This can be attributed to fiber's superiority with respect to its initial cost, its ongoing operation and maintenance expense, and its flexibility and reliability.

With respect, first, to initial costs (incorporating both material and installation), fiber's material costs are lower for the same capacity. Factoring in the cost of fiber's electronics (even those needed solely for narrowband) can, to be sure, reverse that advantage, making copper appear cheaper for short loops; but the comparison does not end there. For one thing, copper's greater weight and volume cause its installation to require heavier equipment and more labor, and the labor costs may further be increased by the greater number and shorter length of the individual copper conductors. Particularly in large metropolitan areas, both media are installed in conduit, a very costly process,² but the far smaller space taken up by fiber per unit of capacity means that these costs will be substantially less when fiber is deployed. The smaller amount of space taken up by fiber offers similar advantages, albeit to a lesser degree, when it is buried or placed overhead.

On an ongoing basis, fiber's maintenance costs have been substantially less on an historical basis than those of copper, by factors of roughly two for buried and underground plant and at least four for aerial plant. Those factors, fully

¹ Tr. 3,182-3,183; see also New York Telephone's 1995 Depreciation Represcription Report, General Narrative Section, pp. 5 - 8. Among other noteworthy passages, that report states, at p. 5, that "Fiber optic cable is now the facility of choice in the feeder/distribution segment of the outside plant network. Individual cost/benefit studies are not required where fiber is chosen."

² As described in Opinion No. 97-2, mimeo pp. 80-81, 86, New York Telephone and AT&T disputed the cost of conduit in New York City. The best reading of the record is that while New York Telephone may have overstated these costs by failing to reflect maximum use of available duct space, AT&T's construction costs, reflected in the Hatfield Model, were unrealistically low.

reflected in the different maintenance carrying charge factors for copper and fiber,¹ may in fact be understated on a going-forward basis, inasmuch as maintenance encompasses repairs and rearrangements, and those activities tend to be increased when plant is first installed and "bugs" need to be worked out. Because there is more newly installed fiber than newly-installed copper, fiber's current maintenance costs, though already lower than copper's, may fall further in the future, particularly when one recognizes that fiber/DLC rearrangements can often be executed electronically, avoiding the cost of dispatching a technician to the site. And fiber's effectively unlimited capacity can produce further savings in customer provisioning, which can be accomplished by the addition of electronics rather than additional cabling or network reconfiguration. The historical savings, as noted, are already reflected in the CCFs; they may also be taken into account, in the Phase 2 decision, in setting the non-recurring charges (NRCs) associated with customer provisioning activities. And to the extent additional savings are realized in the future, the CCFs and NRCs can be further adjusted.²

Finally, fiber offers numerous operational advantages in comparison with copper. Its ability to have its performance monitored on a real-time basis permits faults to be detected and remedied more quickly. In addition, it permits the use of SONET ring networks, which route traffic around faults automatically. Fiber's added reliability is an important public good in a society whose safety and economic well-being depend heavily on

¹ See Opinion No. 97-2, Attachment C, Schedule 2, p. 3 of 3, column B. The carrying charge factors show these differences even after the copper factors have been adjusted to remove the additional maintenance costs associated with deteriorated plant.

² It also stands to reason that there are savings to be realized by using a single medium for all feeder, obviating the maintenance of a dual-technology capability, such as having both fiber and copper frames at a central office. A forward-looking network, therefore, should be designed accordingly.

reliable telecommunications, and greater reliability tends to reduce costs as well.

In view of all these considerations, the Hatfield result showing copper to be cheaper is unpersuasive. (That, and not some improper reversal of the burden of proof, is what underlies the observation in Opinion No. 97-2 that the Hatfield result cannot be fully explained.) We suggested generally that Hatfield had failed "to recognize adequately the lower provisioning and maintenance costs of fiber"; more specifically, the flaw may lie in part in Hatfield's use of a single, "melded" maintenance CCF for both copper and fiber. The CCF is "hard-wired" into the model, making difficult any effort to determine the effects of modifying it. Nevertheless, analysis of the Model suggests that if the copper and fiber maintenance factors were properly distinguished, even Hatfield would show less of an advantage for copper.

For all these reasons, fiber is the technology of choice for narrowband as well as broadband applications. What TELRIC contemplates is the network that would actually be built, using the most cost-efficient, forward-looking technology available, which would certainly lead us to posit all-fiber feeder. These conclusions, based, on the analysis just described, were given added support by the results of the Network Modernization Proceeding and the documents there considered.

The arguments on rehearing offer nothing warranting a different conclusion. Turning first to procedural matters, the petitions for rehearing have shown no impropriety in our use of the Staff Network Report and New York Telephone's 1991 Network Study to provide confirmation of our conclusions. As New York Telephone argues in its response, the courts have sustained our authority to rely on analyses prepared by our expert staff even if they are not part of the evidentiary record and even if they are confidential. Our use of the documents at issue here is well within the scope of that authority, particularly since the Staff Network Report was not confidential and was the subject of litigation, involving some of the present parties, in the Network

Modernization Proceeding, and the Network Study, though claimed to be proprietary, was available to the parties under protection and was referred to in discovery and on the record.

Moreover, contrary to MCI's claim, the exclusion of the Staff Network Report from the record of the Incentive Regulation Proceeding does not call into question the limited use made of it here. Staff there objected to wholesale introduction of the document for the purpose of showing that New York Telephone had already undertaken to achieve some of the network improvements it had offered as part of the quid pro quo for the Performance Regulation Plan. Here, in contrast, we simply referred to a limited set of more objectively ascertainable facts: (1) the Report expressed staff's finding that New York Telephone's plans were reasonable; (2) those plans contemplated fiber in the feeder; and (3) the Commission, in turn, approved the Report. That approval constitutes a precedent shedding some light on an issue in this case.

Similarly, we did not reverse the burden of proof, as AT&T suggests; we merely considered, in evaluating the record in this case, the unexplained divergence between the Hatfield results and those reached in the Network Modernization Proceeding. Accordingly, we were free to take account of this material in reaching our decision.

As for the substantive arguments on rehearing, the extensive reliance on cross-over practice elsewhere is unpersuasive in the absence of additional information on pertinent circumstances (as evidenced, among other things, by New York Telephone's demonstration of the reasons why the Southern New England Telephone Company experience is inapposite), and it fails to take account of special needs in New York City, where fiber's additional reliability and flexibility may be even more important than they are elsewhere. The broadband capacity of fiber also remains largely irrelevant, since our evaluation has established fiber as the technology of choice for narrowband usages; and the additional costs of broadband flow from the additional electronics it requires, which are not taken into

account in costing narrowband loops. (They are taken into account in the higher prices of loops used to provide broadband capability.) New York Telephone's recalculation of Manhattan loop costs using 100% copper,¹ which shows a considerable cost penalty rather than any savings, is subject to challenge and adjustment; but one must also question the Hatfield implication that a new, 100% copper network in Manhattan would cost some 20% of the embedded cost of the existing network, which is 95% copper. Given that copper and labor costs are higher now than when the network was installed and that the embedded network is partially depreciated, it is counter-intuitive at least to suggest that a new, under-depreciated network would cost substantially less, even if constructed without the inefficiencies said to be reflected in the embedded costs.

Even on the view that TELRIC does require a hypothetical narrowband-only network, the conclusion that fiber is the technology of choice even for narrowband would resolve the charge that we have set rates that are not cost-based or that otherwise violate the 1996 Act. AT&T contends further that even if fiber is cost-justified for narrowband applications, its ability to be used for broadband as well suggests that its costs not be assigned entirely to narrowband customers and that they be allocated among narrowband and broadband uses. But since we have concluded that fiber is the technology of choice even for narrowband applications, no such allocation is warranted. A network element is not a service, to which the costs of needed facilities must be allocated; it is, rather, the facility itself. If a reasonable telephone company starting from scratch to build a narrowband system would install fiber, fiber then would be fairly used in calculating the cost of loops purchased by such a company in lieu of building its own facilities; and there is no need to adjust those costs to recognize fiber's incidental

¹ Although the Hatfield Model contemplates fiber for loops exceeding 9,000 feet, few if any loops in Manhattan are that long, and a 9,000-foot cross-over implies, for Manhattan, a 100% copper system.

ability to be used for broadband as well. (We must, of course, take care to exclude any electronics costs related solely to broadband applications, and that has been done here.)

In sum, we have reviewed the all-fiber decision in light of the arguments raised in the petitions for rehearing and see no legal, factual, or policy need to modify that decision. The petitions on this point are denied.

DEAVERAGING

The FCC's rules required that network element rates be geographically deaveraged into at least three zones, and the studies submitted in the proceeding, prepared before those rules were stayed, all used at least four zones. Acting after the rules had been stayed, we deaveraged loop rates on a two-zone basis, specifying one zone identical to the "major cities" zone that New York Telephone had defined as one of its four proposed zones (accounting for approximately 70% of all loops in the state) and another comprising the remainder of the state. We were unpersuaded by New York Telephone's objection (pressed for the first time in brief) to any geographic deaveraging at this time; but we also declined to deaverage further, as most other parties had urged, citing, among other things, uncertainties regarding the data. We nevertheless undertook to pursue further deaveraging promptly and said:

The major cities price is low enough to avoid discouraging competitive market entry in the denser urban markets where it is likely to develop soonest, and the price in other areas is not so high as to be disruptive to the development of competition there. (Indeed, it is still slightly below the current loop rate of \$19.32.) As is often the case in rate design decisions, this gradualist approach represents movement in the right direction, but at a pace tempered by the need to avoid untoward side effects and by recognition of imperfections in the data. We anticipate continued movement in that direction, and we will allow the parties the opportunity to present additional information

on deaveraging issues, including whether Manhattan's cost characteristics warrant regarding it as a separate zone. That inquiry should proceed promptly, in the context of a continuation of this proceeding.¹

AT&T, MCI, MFS, Sprint, and (in its response) NYCHA challenge the deaveraging decision, raising various legal and policy arguments against it and urging, at least in principle, immediate further deaveraging and, in particular, establishment of a separate zone for Manhattan. (As a practical matter, AT&T, though supporting further deaveraging, would not favor it until our costing methods were modified, warning that further deaveraging on the basis of the costing decision would produce "meaningless" and "capricious" results.²) MCI, for example, contends that two-zone deaveraging violates the 1996 Act's requirement that rates be based on costs; it recognizes that the three-zone requirement of the FCC's implementing regulations has been stayed (as noted, it has since been vacated) but asserts that "so clear is the relationship between density [of access lines] and cost that the FCC envisioned the possibility of states deaveraging into [more] than three zones where cost differences so warranted."³ MCI also charges that the rates are not just and reasonable as required by the 1996 Act, citing the view of two commentators that "rates based upon . . . rate averaging concepts are discriminatory in the economic sense because they do not correspond to the costs of supplying service to different customers."⁴ MCI also notes that it, AT&T, and New York

¹ Opinion No. 97-2, mimeo pp. 130-131.

² AT&T's Petition, p. 36.

³ MCI's Petition, pp. 22-23.

⁴ Ibid., p. 23, quoting Kaserman and Mayo, "Cross subsidies in Telecommunications: Roadblocks on the Road to More Intelligent Telephone Pricing," 11 Yale Journal on Regulation, 119, 130 (1994).

Telephone itself had all proposed a greater number of zones and suggests that the decision to use two-zone deaveraging was unfair in view of the case having been litigated on a different premise.¹

Turning to policy matters, MCI asserts that despite the vigorous disagreements among parties, they agreed that differences in density generate dramatic differences in cost. It contends that two-zone deaveraging results in network element prices significantly above cost in New York City, a high-density, low-cost area, and that would-be market entrants who can pay these inflated prices will subsidize New York Telephone while those unable to pay the prices will not enter the market. It suggests that New York Telephone's monopoly will be prolonged by these arrangements, rather than eliminated. It adds that our concern for the effect of further deaveraging on rural areas is not really addressed by the two-zone conclusion, inasmuch as truly rural areas remain in a separate zone.

Notwithstanding its objection to further deaveraging before correction of our costing method, AT&T also maintains that two-zone deaveraging violates the 1996 Act's requirement of cost-based pricing, a requirement that, according to AT&T, tolerates no policy-based exceptions or gradualist approaches. Nor does it see any possible cost justification for the gradualist approach taken in Opinion No. 97-2, given the record evidence on the relationship between cost and density and New York Telephone's concession that density-based cost differences justify at least four zones. MFS argues similarly, welcoming the stated interest in pursuing further deaveraging but asserting that an all-fiber system seriously erodes the benefits of deaveraging (by smoothing out cost differences), and it calls into question the value of devoting additional resources to it.

Sprint calls for deaveraging into at least three zones in order to better track costs, avoid confusion in the event the FCC's three-zone requirement is reinstated by the courts, and

¹ MCI's Petition, p. 22.

allow New York Telephone more time to carry out a three-zone requirement. At a minimum, it urges a separate zone for Manhattan, in view of its unique density characteristics.

In response, New York Telephone sees no need for further deaveraging now, noting the stay of the FCC's three-zone rule and arguing that the cost-based mandate of the 1996 Act does not require geographic deaveraging at all, much less to any particular degree. Disputing AT&T's suggestion that the statutory mandate of cost-based rates precludes consideration of policy issues, New York Telephone contends that policy issues must inevitably be considered in deciding how much deaveraging is the right amount. It notes our declared intention to pursue deaveraging further and observes that parties will have the opportunity to make their cases for additional deaveraging in that context.

Relatedly, New York Telephone disputes MFS's contention (raised by AT&T as well) that the decision on fiber-based feeder undermines geographic deaveraging by concentrating most of the costs in terminating electronics rather than cable and thereby reducing the sensitivity of cost to loop length. New York Telephone observes that geographic deaveraging is done not for its own sake but to reflect cost differences, and if a particular technology entails fewer cost differences, that simply means that less deaveraging is appropriate.

Consistent with the decision in Opinion No. 97-2, deaveraging will be considered further in the next phase of this proceeding, beginning in early fall.¹ No party has shown a need for further action at this time, and none will be taken. We note, however, that we deaveraged rates because doing so constitutes sound ratemaking policy. As in other rate design contexts, we enjoy the discretion to advance a sound policy goal at a pace that avoids outrunning the available data or imposing dislocations on companies or customers. Accordingly, we reject

¹ Cases 95-C-0657 et al., Order Determining Scope of Phase 3 (issued August 29, 1997).

AT&T's suggestion that the cost-based pricing mandate of the 1996 Act requires geographic deaveraging and precludes gradualism in moving toward it.

SWITCHING COSTS

Introduction

New York Telephone's study used an average total installed switch investment of \$586 per line in service (total forward-looking investment of \$6.0168 billion divided by 10.344 million access lines); the Hatfield Model used a figure of \$125 per line (total investment of \$1.414 billion divided by 11.238 million access lines). We expressed skepticism regarding both studies and used, as the comparable figure, a per-line cost of \$286.51. That figure was produced by our analysis, using data provided by New York Telephone in connection with the 1995 depreciation represcription process, of 33 actual switch installations during 1993 and 1994. Those data showed actual investment of \$303.89 per equipped line, but we reduced that figure by 5.72%, to recognize continuation through 1996 of the downward trend in switching costs.

The Hatfield Model requires, as an input, a per-line investment figure net of installation expenses and trunk port investment. The analysis we adopted therefore divided the \$286.51 per-line cost by an installation factor of 1.373 and subtracted, consistent with Hatfield Model documentation, \$16 per trunk port. The resulting input figure of \$192.67 was used for each of the Hatfield switch-size data points, since staff's analysis showed, contrary to the Hatfield premise, no significant correlation between switch size and per-line investment.¹

New York Telephone and MCI seek rehearing on this issue.

¹ The discussion of this issue appears at Opinion No. 97-2, mimeo pp. 84-86.

New York Telephone's Petition

In its petition, New York Telephone defends its own study, (which it comprehensively summarizes) against our criticisms and asserts our analysis is seriously flawed.

With respect to its own study, New York Telephone disputes the criticism that some of the key inputs into the switching cost information system (SCIS) were left obscure and contends they are set forth in its work papers or otherwise discussed. It justifies its having modeled only four central offices on the grounds that they represented one SCIS model office for each density zone and that using zone-specific model offices captured the typical features of switching costs in each zone. As for the concern that New York Telephone's study implied a switching investment significantly exceeding the 1995 embedded figure, New York Telephone notes the FCC's statement that TELRIC costs might be higher or lower than historical embedded costs and explains the difference on the grounds that the embedded switching investment reflects the higher discounts available for digital switches supplied to replace existing analog switches, a discount not expected to be continued and therefore properly excluded from a forward-looking study. It adds that while some elements of the costs of providing telecommunications services have decreased in recent years and may continue to decrease, others are less affected by technological innovation and may increase.

Turning to our analysis, New York Telephone asserts, first, that the 1995 depreciation represcription data used by staff as the source for the actual cost of switches installed in 1993 and 1994 do not provide a suitable sample for assessing forward-looking investment. Of the 40 installations listed in the report¹, it says, only 13 were complete central office local switches; the remainder were various types of remotes whose costs

¹ New York Telephone expresses uncertainty as to why Opinion No. 97-2 refers to only 33 such installations. In fact, the report refers to 42 switches.